



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
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24 July 2006

## FINAL CRUISE INSTRUCTIONS

NOAA Ship: NOAA Ship *David Starr Jordan*

Cruise Number: DS-06-05      SWFSC Cruise Number: 1630

Cruise Dates: 28 July - 07 December, 2006

Cruise Title: *Stenella* Abundance Research Project (STAR 2006)

The project is a cetacean and ecosystem assessment survey with two vessels. The activities of the other vessel, NOAA Ship *McArthur II*, are covered under a separate Announcement. SEE SECTION 11.0 FOR THE STAR CRUISE EXCLUDING THE WATERS OF THE MEXICAN EEZ.

Study Area: The eastern tropical Pacific Ocean (ETP).

### Itinerary:

28 JUL- EK 500 Calibration

LEG 1: 29 JUL - Depart San Diego, CA

LEG 2: 17 AUG - Depart Mazatlán

LEG 3: 07 SEP - Depart Puntarenas

LEG 4: 03 OCT - Depart Puerto Quetzal

LEG 5: 25 OCT - Depart Acapulco

LEG 6: 18 NOV - Depart Manzanillo

14 AUG- Arrive Mazatlán, Mexico

04 SEP - Arrive Puntarenas, Costa Rica

27 SEP - Arrive Puerto Quetzal, Guatemala

22 OCT - Arrive Acapulco, Mexico

15 NOV - Arrive Manzanillo, Mexico

07 DEC- Arrive San Diego, CA/EK 500 Calibration

Tracklines are included at the end of this document in Appendix 1, and waypoints are included in Appendix 2.

Sponsoring Institution: NOAA/NMFS, Southwest Fisheries Science Center (SWFSC)  
Protected Resources Division (PRD)

### Cruise Description and Objectives:

The primary objective of the *Stenella* Abundance Research cruise is to investigate trends in population size of those dolphin stocks most affected by the eastern tropical Pacific tuna purse-seine fishery. This is a multi-year study with previous cruises in 1986-1990, 1998-2000, and 2003 (see the STAR website at <http://swfsc.nmfs.noaa.gov/prd/PROJECTS/star/default.htm> for previous cruise information). The project takes a multidisciplinary approach. Data on cetacean distribution, school size, and school composition are collected to determine abundance. Oceanographic data are collected to characterize physical and biological habitat and its variation over time. Data on distribution and abundance of seabirds, prey fishes, marine turtles, and squids will further characterize the ecosystem in which these dolphins live. Photographs of dolphin schools taken from a NOAA Twin Otter aircraft will indicate school size and structure. Skin biopsies of cetaceans provide a database for investigations of stock structure and phylogenetic relationships. Photographs document geographic variation in dolphin morphology and pigment patterns and distribution of individual large whales.

Chief Scientist: Dr. Lisa T. Ballance, SWFSC (858) 546-7173, [isa.Ballance@noaa.gov](mailto:isa.Ballance@noaa.gov)



## PLAN OF OPERATIONS

### 1.0 CETACEAN RESEARCH

Weather permitting, visual watches will be conducted by observer teams on the flying bridge during all daylight hours (from sunrise to sunset).

1.1 Cetacean Survey - A daily watch for cetaceans will be maintained on the flying bridge during daylight hours (approximately 0600 to 1800) by 6 mammal observers. Each observer will work in 2-hour rotations, manning each of the following 3 stations on the flying bridge for 40 minutes: a port side 25x150 binocular station, a center data recorder position, and a starboard 25x150 binocular station. Line-transect survey methods will be used. At the beginning of each day the search effort should start on the trackline. The *Jordan* should travel at 10 knots (through the water) along the designated trackline. While on search effort if the ship's speed through the water should deviate from this by more than two knots, the bridge personnel will notify the mammal team on watch or the Cruise Leader. The bridge personnel will notify the marine mammal team of any course changes.

1.1.1 Logging of Data - A log of observation conditions, watch effort, sightings, and other required information will be entered into a computer, hooked up to the ship's GPS (for course, speed and position information) and SCS (for weather and heading information). If the SCS goes down for any reason, the ship's Electronics Technician must manually restart the WINDACS\_DSJ event (in addition to the other events). All science computers must be connected to the same ship's GPS and networked to the time server. An "independent observer" may keep a separate watch of animals sighted during the cetacean survey operations to be compared later with the observer team's data.

1.1.2 Breaking Trackline - On sighting a cetacean school or other feature of interest, the Cruise Leader or marine mammal observer team on watch will request that the vessel be maneuvered to approach the school or feature for investigation. As the ship approaches a school, observers will make independent estimates of school size. Biopsy and photographic operations may commence from the bow based on directions from the Cruise Leader or Senior Marine Mammal Observers. In some instances, the Cruise Leader will request the deployment of a small boat for biopsy, photographic, or other operations (see section 3.0).

It may occasionally be necessary to divert the ship's course from the established trackline during regular effort due to glare or adverse sea conditions. Under these circumstances, the ship may divert up to 30 degrees from the established course. This deviation may continue until the ship is 10 nautical miles from the trackline, at which point the ship should turn back toward the trackline.

1.1.3 Dive-Interval Studies - Sightings of deep-diving whales will prompt dive-interval studies at the discretion of the Cruise Leader. The collection of dive-interval data is necessary to produce sightability correction factors for those species that spend a considerable amount of time diving. The Cruise Leader or observer team on watch will direct the vessel during these observations.

1.1.4 Resuming Effort - When the observers have completed operations for the sighting, the ship will resume the same course and speed as prior to the sighting. If the pursuit of the sighting has taken the ship more than 10 nautical miles from the trackline, the observers should be notified. The Cruise Leader or Senior Marine Mammal Observers may request that rather than proceeding directly toward the next waypoint, the ship take a heading back toward the trackline.

1.2 Biopsy Sampling - Biopsy samples for genetic analyses of cetaceans will be collected on an opportunistic basis. Necessary permits will be present on the vessel. The animals to be sampled will be either approached by the research vessel during normal survey operations, will approach the vessel on their own, or will be approached by a small boat. Samples will be collected from animals within 10 to 30m of the bow of the vessel using a dart fired from a crossbow or rifle. With the exception of the small boat and safety gear, all necessary equipment will be furnished and deployed by the scientific party.

1.3 Photography - Photographs of cetaceans will be taken on an opportunistic basis. These will be used to study social behavior and movement patterns of identified individuals, and to study geographic variation. Necessary permits will be present on the vessel. The animals to be photographed will be approached by the research vessel during normal survey operations, will approach the vessel on their own, or will be approached by a small boat. With the exception of the small boat and safety gear, all necessary equipment will be furnished by the scientific party.

#### 1.4 Acoustics

1.4.1 Sonobuoys - Sonobuoys may be deployed periodically from NOAA Ship *David Starr Jordan* or a small boat on an opportunistic basis at the discretion of the Cruise Leader. With the exception of the small boat and safety gear, all necessary equipment will be supplied and operated by scientific personnel.

1.4.2 Bow Hydrophone - A hydrophone mounted on the bow may be activated by scientific personnel at the discretion of the Cruise Leader. All of the necessary equipment will be supplied and operated by scientific personnel.

1.5 Aerial Photogrammetry - During Leg 5, the ship will conduct coordinated operations with a NOAA Twin Otter aircraft operating out of airports along the west coast of Mexico (mainly Acapulco). The ship will be required to deploy and retrieve 50' sections of PVC pipe that will be used to calibrate the radar altimeter on the aircraft. This operation will require approximately one hour, and the pipes will be attended by the ship's small boat at least 100 yards away from the ship. The small boat will drift alongside the pipes and ensure they are straight. Communications between the ship's scientific party and the aircraft will be via Iridium phones at long range and VHF at short range. On days with excellent weather (Beaufort 2 and below) the aircraft will fly to the area of the vessel to collect vertical photographs of schools detected from the ship and will also attempt to locate schools in the ship's immediate vicinity. Data from the images will be used to calibrate observer estimates of school size and to estimate calf production for populations sampled. During days of ship/aircraft operations, school size calibration will take precedence over line transect sampling. It is expected that ship/aircraft operations will last between one and two weeks. The Cruise Leader will coordinate communications with the aircraft and keep the Command and Operations Officer informed of daily operations planning.

1.6 Salvage of Cetaceans - Cetacean body parts may be salvaged on an opportunistic basis at the discretion of the Cruise Leader. This includes whale and dolphin teeth, bones, and carcasses. In the event that this occurs, scientific freezer space will be used to store the cetacean body parts. Permits to salvage and import cetacean parts will be present on the vessel. These permits are valid in US territorial waters and on the high seas only. All cetacean specimens obtained will be archived at the SWFSC but may be released on loan to recognized research institutions according to existing guidelines.

## 2.0 ECOSYSTEM STUDIES

2.1 Oceanography - Oceanographic sampling will be conducted by the Oceanographers and other designated scientists. A chronological record of oceanographic and net tow stations will be kept by the ship (Marine Operations Log) with dates and times in GMT. The ship will provide a printed and electronic copy of the marine operations log (with the cruise Weather Log and SCS data) to the Chief Scientist at the completion of the cruise.

2.1.1 ADCP - The Oceanographer will conduct a test at the beginning of the cruise and periodically thereafter to determine if the ship's ADCP causes any interference with the EK500 signal. If interference is observed, the ADCP will remain off unless required by the ship's Command. If the ADCP is used, complete system settings will be provided by the Oceanographer, and will include 5-minute averaging of currents, AGC, and 4 beam returns in 60 8-meter bins.

2.1.2 Thermosalinograph Sampling - Ship personnel will provide and maintain a thermosalinograph (TSG), which is calibrated and in working order, for continuous measurement of surface water temperature and salinity. A backup unit (calibrated and in working order) will also be provided by ship personnel and will remain aboard during the cruise. The SCS will serve as the main data collection system for the TSG. The Oceanographer will provide the ship's Operations Officer and Electronics Technician with detailed SCS acquisition information. The SCS data acquisition will be stopped and restarted weekly by the Electronics Technician so data files can be backed up and checked for errors. All SCS and raw data will be provided to the SWFSC Oceanographer following each leg of the cruise.

2.1.3 Filtering water samples - Concurrent with squid sampling and dipnetting, small samples of particulate organic matter (POM) and zooplankton will be collected by the visiting scientist in charge of squid sampling. One hour prior to the evening CTD, seawater will be collected from the ship's uncontaminated seawater system, pre-filtered to remove large particles, and placed in a 10L carboy filtration system. The water will be left for at least three hours to filter on to 25mm glass fiber filters. The glass fiber filters will be stored frozen. For zooplankton collection, seawater collected from the sea surface will be poured over a home-made nitex filter and stored frozen.

2.1.4 XBT Drops - There will be three XBT drops per day, at approximately 0900, 1200 and 1500 hours local ship time, or as requested by the Cruise Leader. The XBTs will be provided by the Southwest Fisheries Science Center, and the launcher/computer will be provided by the ship. If the vessel is stopped at the scheduled launch time, the drop will be delayed until the ship is underway again. The scientist performing the drop should contact the bridge prior to deploying the XBT to ensure the vessel will move within half an hour. If the vessel will not move within half an hour, the drop will be delayed or canceled at the discretion of the Cruise Leader.

2.1.5 Surface Water Samples - A surface water sample for chlorophyll *a* analysis and a bucket temperature will be collected by the Cruise Leader at approximately 0900, 1200, 1500, and 1800 hours local ship time daily.

2.1.6 Argo Buoy deployments - Up to ten Argo buoys will be deployed by scientific personnel to help fill in the coverage gap in the eastern tropical Pacific Ocean. Argo is a major contributor to the WCRPs Climate Variability and Predictability Experiment (CLIVAR) and to the Global Ocean Data Assimilation Experiment (GODAE). The Argo array is part of the Global Climate Observing System/Global Ocean Observing System GCOS/GOOS.

The times and locations of the deployments will be determined by the Cruise Leader in consultation with the Command (see Appendix 7.0 for deployment locations). Buoys will be deployed off the stern by a member of the scientific party after notifying the Deck Officer. The buoys will be loaded in San Diego and secured in a weather protected area; they must be stored horizontally at all times.

2.1.7 Underway pCO<sub>2</sub> System - The Pacific Marine Environmental Laboratory's underway pCO<sub>2</sub> system will measure the partial pressure of CO<sub>2</sub> in the air and surface water while the ship is underway. The pCO<sub>2</sub> values, along with wind data, temperature, and salinity will be used to calculate the flux of CO<sub>2</sub> at the air-sea interface. The system will require 3 liters of seawater per minute, and will determine CO<sub>2</sub> content with a Licor infrared detector. Maintenance will include: daily verification that the system is operating correctly, e-mail transmission of CO<sub>2</sub> data to PMEL, and replacement of magnesium perchlorate desiccant every 3 days.

2.1.8 CTD - The main SeaBird CTD system will be provided, maintained, and operated by the scientific party. The collection of CTD data, samples, and their processing will be conducted by the scientific party. The crew of the vessel will operate all deck equipment and will be responsible for the termination (and any necessary reterminations) of the CTD cable pigtail (provided by the scientific party) to the conducting cable of the winch. The ship shall provide a complete backup system, consisting of a frame with weights, a 12-place rosette with bottles, a deck unit, and a SeaBird 9/11+ CTD with conductivity and temperature sensors. All instruments, their spares, and spare parts provided by the ship must be maintained in working order and, if applicable, have current calibrations (within the previous 12 months). We will use both the primary and backup conductivity and temperature sensors during our casts; conducting CTD casts with two temperature and salinity sensors provides immediate feedback about the performance of the sensors and the validity of the data. To ensure longevity of the CTD and Bottles, the CTD must be rinsed completely with fresh water after every cast, and the CTD and rosette must then be covered and secured by the oceanographer.

2.1.8.1 - Initial CTD Cast for Each Leg - We request an additional CTD cast on the first evening of oceanographic operations for each leg of the cruise. This cast will be used to test the agreement among salinity samples collected from all CTD bottles. For this cast, a maximum depth of 700m is needed; at this depth, all bottles will be fired. The rate of CTD ascent and descent for this cast can be 60m per minute. The oceanographer will need time to take salinity samples from all bottles before the regular CTD cast can be conducted. The total amount of time needed for this cast is expected to be one hour: 30 minutes for the cast, 15 minutes for the sampling, and 15 minutes to prepare the CTD for the regular evening cast.

2.1.8.2 CTD Stations - Weather permitting, two CTD stations will be occupied each night; an evening cast and a pre-dawn cast. CTD data and seawater samples will be collected using a SeaBird 9/11+ CTD with rosette and Niskin bottles fitted with silicone tubing and o-rings (supplied by the scientific party). All casts are to 1000 m, with the descent rate at 30m/min for the first 100m of the cast, then 60m/min after that, including the up cast between bottles. Bottle samples will be collected from 12 standard depths (0, 20, 40, 60, 80, 100, 120, 140, 170, 200, 500, and 1000m). From each cast, chlorophyll samples will be collected from all depths  $\leq 250$ m, and processed on board. The 265ml chlorophyll samples will be filtered onto GF/F filters, placed in 10ml of 90% acetone, refrigerated for 24 hours, and then analyzed on a Turner Designs model 10AU field fluorometer. Salinity samples (from all 12 Niskin bottles) will only be taken from casts where bottle tripping errors are found. Analysis will be done by the oceanographer. Cast times are subject to change since sunrise and sunset will vary during the cruise. Additional CTD stations may be requested by the Cruise Leader in areas of special interest.

2.1.8.3 Pre-dawn Cast - The morning cast will begin approximately one and one-half hours prior to sunrise. The exact starting time will be determined the evening before, by the Operations Officer or Deck Officer. The schedule may be modified by the Oceanographer. Samples for chlorophyll will be collected as detailed above.

2.1.8.4 Evening Cast - An evening CTD cast will be conducted no sooner than one hour after sunset. The exact time will be determined by the Deck Officer (by 1800 local ship time that day). Samples for chlorophyll will be collected as detailed above.

2.1.9 Buoys - The ship may be required to approach oceanographic buoys to repair or maintain scientific instruments for the Tropical Atmosphere Ocean (TAO) project. This will occur on an opportunistic basis at the discretion of the Cruise Leader, providing the Commanding Officer concurs that conditions are safe for such operations.

## 2.2 Prey Fishes and Squids

2.2.1 Acoustic Backscatter - The scientific EK-500 depth sounder will be operated, at 38, 120, and 200KHz and interfaced to a data acquisition system to estimate micronekton biomass between 0 and 500m. The vessel's EQ-50 depth sounder may be used at the discretion of the Commanding Officer, but will normally remain off while underway in deep waters. The ship shall inform the Cruise Leader of any use of the vessel's EQ-50, as it interferes with the signals received on the scientific EK-500. Use of the scientific EK-500 will be continuous or at the discretion of the Cruise Leader.

2.2.2 Net Sampling - Net tows will be conducted by the scientific party with the assistance of a winch operator from the vessel. The schedule for these tows may vary by leg and may need to be modified by the Cruise Leader.

2.2.3 Dipnetting - Concurrent with the evening CTD station, dipnetting for surface fauna will be conducted by scientific personnel, for one full hour, from the starboard side of the ship. This station is to begin no sooner than one full hour after sunset. One or more deck lights will be necessary to illuminate the water surface in the area of dipnet sampling. Samples will be preserved, labeled, and stored in the vessel's freezer. Surplus samples of any species of fishes, cephalopods, and crustaceans, will be labeled and frozen for the Food-web Isotope Project. Scientists may also collect surface fauna for aquarium tanks on board. All live organisms will be donated to the Scripps Aquarium upon return to San Diego.

2.2.4 Collection of Squid - Concurrent with the evening CTD station and dipnetting, cephalopods *Dosidicus gigas* and *Sthenoteuthis oualaniensis* will be collected in the evening using attracting lights and handline jigs. They will be collected along the Pacific Coast of Mexico (off the Pacific Coast of the Baja Peninsula, Central Coast, and Gulf of Tehuantepec), El Salvador, Costa Rica Dome, and Ecuador. A total of 30 *D. gigas* will be caught at each of the 10 to 13 stations in the areas described above. *S. oualaniensis* (n = 30) will be collected only if *D. gigas* is found in the same area. Juvenile squid swimming at the surface may be collected with dip nets. Squids will be labeled (ship, date, GPS position, and time). During Legs 1 and 2, squids will be weighed, sexed, and measured by the visiting scientist in charge of squid sampling. Gill and muscle tissue samples, the complete beak, and stomachs will be saved for processing later. Gill samples will be stored in 95% ethanol in 1.5ml plastic vials; muscle tissues, beaks, and stomachs will be kept frozen at -20°C. Squid with mantle lengths less than 30 cm will be kept frozen intact. During Legs 3 through 6, all specimens will be frozen intact as soon as possible and labeled (ship, date, time, and latitude and longitude position).

In areas not mentioned above, squids of all species with mantle sizes 35cm or less will be collected opportunistically during dipnetting, labeled (ship, date, time, position), and frozen whole for the Food-web Isotope project. Two specimens per species per sampling location are sufficient.

2.2.5 Manta Tow - A surface manta net tow will be conducted for fifteen minutes immediately following the evening CTD station and dipnetting. The manta tow is conducted in the dark; hence, the deck lights need to be turned off for the duration of the tow. The net should be deployed from the starboard hydro winch. Samples will be preserved in formalin, labeled, and stored in containers provided by the SWFSC until the vessel returns to San Diego. Estimated completion time for the entire procedure is 30 minutes.

2.2.6 Bongo Tow - An oblique bongo tow will be conducted for 15 minutes (45 minute station time), to a depth of 200m (wire out 300m on starboard hydro winch) immediately following the manta tow. The Bongo has 505 micron mesh on the starboard side, and 333 micron mesh on the port side. The samples will be preserved in formalin or frozen (isotope analysis), labeled and stored in containers provided by the SWFSC until the vessel returns to San Diego. Two cod ends will be used on the bongo tow.

2.2.6.1 Samples for Leatherback Turtle Diet Isotope Project and the Inter-American Tropical Tuna Commission Food-web Isotope Project - The contents of the second cod end of the 333 micron mesh bongo tow will be collected, placed in whirl-packs, labeled, and stored frozen for later stable isotope analysis. Samples will be separated twice a week with gelatinous samples specifically stored for the Turtle Diet Isotope Project. J. Seminoff (SWFSC) and R. Olson (IATTC) will provide supplies to label and store these samples.

2.2.7 Collection of Fish - Fish will be collected on an opportunistic basis at the discretion of the Cruise Leader. While underway, trolling gear will be used when conditions permit. While stationary, hook-and-line gear will be used. Fish will be measured, sexed, and stomach contents will be examined and recorded by scientific personnel. The stomach with contents intact, a piece of liver, and a core of white muscle will be removed from each scientifically caught fish and stored frozen for the Food-web Isotope Project (R. Olson, IATTC, will provide supplies and instructions). The Cruise Leader will be responsible for the disposition of the catch, in accordance with NOAA Administrative Order 202-735B, dated January 9, 1989. All flyingfish specimens that land on the decks will be collected by the scientific party and frozen. We request that any individual who finds a flyingfish on deck please notify Robert Pitman or the flyingfish team leader.

2.2.8 Collection of Jellyfish samples - Jellyfish and other gelatinous plankton will be collected opportunistically for leatherback turtle dietary studies. Jellyfish will be collected using dip nets, during scheduled bongo and manta tows, opportunistically from the surface, or from the small boat. Jellyfish and gelatinous plankton on the CTD will be collected upon its retrieval. Samples will be frozen for future stable isotope analysis.

2.3 Seabird Research - Weather permitting, visual surveys for seabirds will be conducted by seabird observers from the flying bridge during all daylight hours (sunrise to sunset).

2.3.1 Seabird Survey - Visual surveys of seabirds will be conducted from the flying bridge during daylight hours by two seabird observers. A log of visibility conditions, effort, sightings, and other required information will be entered into a computer interfaced with the ship's GPS (for course,

speed, and position information) and SCS (for weather and heading information). All science computers must be connected to the same ship's GPS. Seabird observers will use both handheld and 25x150 binoculars.

2.3.2 Seabird Collection - Two shotguns and ammunition will be used to collect seabirds on an opportunistic basis. A small boat will be required for specimen collection. Necessary permits will be present on the vessel. Weapons and ammunition will be turned over to the Commanding Officer immediately upon boarding and stored in the gun locker.

2.3.3 Seabird Colony Censuses - Nesting site surveys may be conducted by the scientific party at locations to be determined by the Cruise Leader. The vessel's small boat(s) may be required for transporting observers to and from nesting sites for ground counts (on foot) of the seabird colonies. Potential islands include: Clipperton, France; Alijos Rocks, Mexico; San Benedicto, Mexico; Guadalupe, Mexico; Malpelo, Colombia; and Cocos, Costa Rica. Growing feathers (one per bird) may be collected from up to 10 individuals from shearwater species on San Benedicto, Mexico, from up to 10 individuals of storm-petrel species on Guadalupe, Mexico, and from up to 40 individuals from each of several different species on Clipperton Island, France. All necessary permits will be aboard the vessel.

2.3.4 Seabird Diet Study, Malpelo Island, Colombia - On Leg 3, three scientists will study the Nazca Booby diet; one of the scientists will be a Colombian national who has spent several months conducting seabird research on the island already. The drop-off at Malpelo will occur on the afternoon on the third day out of Costa Rica, and the pickup will occur on the afternoon of the eighth day, allowing 5 days on the island. The scientific party will carry an iridium phone with them on the island to communicate with the ship. Scientists will catch to 200 individuals (max) and collect regurgitations from the birds. Birds will be measured and weighed, and then released unharmed. Regurgitation samples collected on Malpelo Island will be brought back to the ship to be frozen for future processing. After processing, representative parts of the samples (e.g. otoliths, squid beaks) will be sent back to the Colombian Marine Natural History Museum (MHNMC in Spanish; see [www.invemmar.org.co](http://www.invemmar.org.co), <http://www.invemmar.org.co/>). No birds will be collected on Malpelo.

2.4 Marine Turtle Research - A visual survey for marine turtles will be conducted by the mammal and seabird observers on the flying bridge during all daylight hours. Data will be recorded in both mammal and seabird databases. Marine turtles will be captured from a small boat on an opportunistic basis at the discretion of the Cruise Leader. Turtles may be measured, weighed, flipper tagged, and a small amount of blood or skin may be collected for genetic and stable isotope analysis, or hormonal studies. All turtles will be subsequently released unharmed. At the discretion of the Cruise Leader, one or more turtles may be fitted with a satellite transmitter and released. The transmitter will be attached to the carapace with fiberglass resin. Also at the discretion of the Cruise Leader a stomach lavage may be performed on selected turtles. With the exception of the small boat and safety gear, all necessary equipment will be supplied and operated by the scientific party. All necessary permits will be aboard the vessel.

### 3.0 SMALL BOAT WORK

A small boat may be necessary for biopsy sampling, photography, seabird collection, island surveys, and marine turtle work. Deployment will be requested by the Cruise Leader on an opportunistic basis, possibly multiple times in a single day, providing the Commanding Officer concurs that operating conditions are safe. Unless the Commanding Officer allows otherwise, the small boat will remain within sight and radio contact at all times while deployed. The small boat will return to the ship immediately



when recalled by the CO, OOD, or Cruise Leader. With the exception of the small boat and required safety gear, all necessary equipment will be furnished by the scientific party. See Appendix 4 for the Intent to Use Small Boats and Assessment of Risk Memorandum.

#### 4.0 TRANSIT AT NIGHT

When scientific operations are complete for the night, the ship will resume course along the trackline, at a speed determined by the Cruise Leader, until it is necessary to stop for the morning (pre-dawn) CTD station. It is estimated that the ship will need to transit between fifty and 100 nautical miles per night. The Cruise Leader will determine the nightly transit length on a daily basis.

#### 5.0 SCIENTIFIC PERSONNEL

5.1 Chief Scientist - The Chief Scientist is Dr. Lisa T. Ballance, SWFSC, at phone (858) 546-7173. The Cruise Leader is the authorized representative of the Chief Scientist, with all the designated powers and responsibilities of the Chief Scientist.

The Chief Scientist is authorized to alter the scientific portion of this cruise plan with the concurrence of the Commanding Officer, provided that the proposed changes will not: (1) jeopardize the safety of personnel or the ship, (2) exceed the time allotted for the cruise, (3) result in undue additional expense, or (4) change the general intent of the project.

5.2 Participating Scientists - Please see Appendix 3.

5.3 Passports - Each member of the scientific party will have a valid passport for the cruise. All SWFSC personnel will have a government passport and orders for official travel (which includes time on the ship) and a personal passport for recreational travel. All personnel will have a birth certificate (or copy) or picture identification aboard as a backup for the passport, for issuance to and from foreign ports. All scientific personnel will have government identification cards.

5.4 Medical Forms - All scientific personnel will complete a NOAA Health Services Questionnaire (NHSQ) prior to embarking, as per NC Instruction 6000. This form will be routed through MOP Health Services 30 days prior to the cruise and must be approved by MOC-P Medical Office prior to embarkation.

5.5 Medications - Scientific personnel that need prescription medications will ensure that they bring enough for the 4-month long cruise. Those scientific personnel that take over-the-counter medication on a regular basis (such as ibuprofen, aspirin, decongestants, etc.) will ensure they bring adequate supplies for the cruise.

5.6 Conduct Memorandum - All shipboard personnel including crew and embarked scientists will know the NOAA no tolerance policy on the use of illegal drugs and alcohol and sexual harassment located on the MOCDOC website at: <http://205.156.48.106/> (see specifically MOCDOC 11-2003 12 CCL, MOCDOC 11- OMAO 03, MOCDOC 38-1998 05 DJB, and MOCDOC 38-1998 05 JCA). Also see Appendix 5 and 6 for shipboard policies.

## 6.0 EQUIPMENT

### 6.1 Supplied by scientific party:

1. Nine 7x50 hand-held binoculars
2. Four 25x150 binoculars and stands
3. One 20x60 hand-held gyro-stabilized binoculars
4. Three observer chairs for flying bridge
5. Wooden decking for flying bridge
6. Video camera and tapes
7. Three Digital SLR cameras, and one 35mm camera with lenses, 35mm film
8. Five handheld radios with chargers
9. Laptop computers (2 - 3) for scientific party e-mail use
10. Two desktop computers mounted below decks with CAT5 KVM connections to three remote console units on the flying bridge.
11. Portable GPS component as backup to ship's system
12. Sampling jars for Halobates
13. Shotgun and ammunition (for seabird collection)
14. Crossbows, rifles, biopsy darts and tips, miscellaneous tools, sample vials and sample preservative (Ethanol, DMSO with MSDS), 1 notebook computer for biopsy data entry, thermal label printer, and laser printer
15. Formalin and sodium borate
16. Manta tow frame and net including spare frame and nets
17. Bongo frame and nets (including spare frame and nets)
18. Glass sample containers with lids for net tow samples, pint (20 boxes), quart (5 boxes) and gallon (1 box/4 each)
19. XBT probes (Deep Blues) – 30 cases to be stored in two fish boxes and lab spaces
20. Two computers for oceanographic data processing, for acoustic (EK 500) data acquisition, and one spare
21. Fluorometer (TD10AU) and one backup (TD10) for discrete chlorophyll *a* analysis
22. Lab apparatus, logs, and supplies for discrete chlorophyll *a* analysis
23. SeaBird 9/11+CTD system including rosette, 1.7 liter Niskin bottles (15), and CTD cable and pigtail
24. Chemicals: 90% Acetone, Hydrochloric Acid, and Triton x-100.
25. Small refrigerator for chlorophyll *a* extraction
26. Bucket thermometer holder and thermometer (and 2 spares)
27. Safety (MSDS) and clean up materials for all chemicals
28. Oceanographic data logs and log books
29. Turtle capture device and sampling gear
30. Calipers, flipper tags and applicators, scale, and blood collection equipment for turtle research
31. Up to ten satellite transmitters for turtles (must be stored in freezer)
32. Fiberglass resin, catalyst, cloth and supplies for attaching turtle transmitters
33. Laptop computer and communication box for programming turtle satellite transmitters
34. Telonics handheld receiver (400-465MHZ) for turtle satellite transmitters
35. Five automobile tires for holding turtles
36. Small bench top centrifuge for turtle blood
37. Two long-handled dipnets and sample containers
38. Up to 2 gimbaled 20 gal aquarium tanks (for inside use)

39. Up to 2 50-gallon aquarium tanks (for outside use)
40. Four pallets of sonobuoys (5'x5'x5', 1200 lbs when full)
41. Two sonobuoy receivers
42. DAT recorder and laptop PC for sonobuoys
43. Permits for specimen collection and foreign research
44. Computer data storage media (diskettes, etc.)
45. 2 Cases of printer paper
46. Up to 10 Argo buoys
47. Bow mounted hydrophone (to be mounted by ship's personnel)
48. Mustang suits
49. VHF base radio for flying bridge
50. Seven fish boxes
51. One Iridium phone
52. Ten -10ft sections of PVC pipe for Twin Otter Aircraft radar altimeter calibration
53. Water filtration equipment and supplies: pressure/vacuum pump; 10 L carboy with tabulation, fittings; GF/F filters and holder; graduated container to measure filtered water
54. Plastic bags, vials, labels, recording sheets (Squid Project), measuring tape, 2 Digital Vernier Caliper, 2 digital balances, 1 Scout Pro 400 X 0.1g, 2-Scout Pro 6000 X 1 g, and dissecting kit.
55. Handline jigs (6 to 12 different sizes)
56. Two 2' x 2' boxes which will be mounted to the bulkhead near the seawater supply, and near a sink.
57. 4 gas cylinders (the size of a SCUBA diving tank) which will be connected to the pCO<sub>2</sub> system via 1/8" copper tubing
58. 2 Rubbermaid storage totes containing miscellaneous supplies.
59. 1 toolbox
60. 3/8" Decaron tubing which will be run from the underway pCO<sub>2</sub> system to the bow of the ship
61. 1 jar of magnesium perchlorate desiccant

6.2 Supplied by ship - We request the following systems and their associated support services, sufficient consumables, back-up units, and on-site spares. All measurement instruments are assumed to have current calibrations and we request that all pertinent calibration information be included in the data package.

1. Insulated CAT cable running from location site for mammal and seabird CPUs to the flying bridge consoles.
2. Power, ship's GPS, ship's SCS connections to mammal and seabird CPUs running the flying bridge consoles, and networked time server.
3. Canopy on flying bridge
4. Three handheld radios (as spares)
5. Small boat for biopsy sampling, photography, seabird collection, seabird colony censuses and marine turtle research
6. Deck lighting for dipnetting
7. Freezer space for water samples (walk-in and upright freezers) and biological samples (-80°)
8. Termination for SeaBird CTD cable (including Chinese finger and shackle)
9. Back-up SeaBird CTD, deck unit, rosette, frame with weights, and 12 Niskin bottles (any size)
10. Oceanographic winch with minimum 1500m of .322" conducting wire, terminated to CTD
11. Hydrographic winch with minimum 400m cable (1/4" to 3/8" diameter) for net tows
12. Bottom depth checking during CTD casts and net tows in depths less than 2000m.
13. SeaBird thermosalinograph (SBE21) and connection to SCS
14. Sippican XBT launcher (prefer aft deck location) and connection to SEAS/Sippican software

15. Fume Hood (located in port lab, port counter next to refer)
16. Storage space on aft deck for 18 boxes of XBTs (in 2 fish boxes 48"x44"x30") and 12 boxes inside the ship (main or aft laboratories)
17. Storage space for 7 fish boxes
18. Scientific Computing System for data collection
19. Simrad EQ50 echosounder and input cables in SIC room
20. Simrad EK500 scientific sounder and input cables
21. Constant temperature room (20-22°C)
22. Counter space for SWFSC supplied scientific computers and connections to network
23. Hook-up (CTD) and counter space for SWFSC-supplied oceanographic computer and connections to the network
24. Deck space for two manta frames (one spare) and two bongo frames (one spare)
25. RDI 150-kHz ADCP and data acquisition system.
26. Marine Operations and Deck Log (electronic)/Weather Observation sheets, filled out by Deck Officers
27. Installation of SWFSC-supplied sonobuoy antenna and coax cable
28. Exterior storage space for 4 pallets of sonobuoys (see item 43, Equipment Supplied By the Scientific Party)
29. Copy Machine and fax machine
30. Additional email computer for scientific email use in dry Lab.
31. Storage space (prefer weather protected) for 10 Argo buoys (each in 17"x17"x85" boxes)
32. Network access to a printer for biopsy sampling computer
33. Lab space with power and water available for operation of the portable genetics lab (if permits require)
34. Personal Floatation Devices
35. Space for aquarium on the back deck
36. 3 liters/minute of seawater
37. We'd also like to tap into the data feed from the TSG, or attach a serial cable to the SCS system so we can log sea surface temperature and salinity e-mail transmission of data to PMEL

6.3 Installation and Maintenance - Prior to departure from San Diego the Chief Scientist and members of the scientific party may board the vessel, with permission of the Commanding Officer, to test survey equipment and environmental sensors, set up equipment, and assemble equipment and work spaces on the flying bridge.

During the cruise, the temperature of the freezer and the refrigerator must be monitored by the ship's engineering staff twice daily, and the Cruise Leader notified in the event of significant changes.

6.4 Hazardous Materials - The Chief Scientist shall be responsible for complying with MOCDOC 15, Fleet Environmental Compliance #07, Hazardous Material and Hazardous Waste Management Requirements for Visiting Scientists, released July 2002 (<http://205.156.48.106/>). By Federal regulations and NOAA Marine and Aviation Operations policy, the ship may not sail without a complete inventory of all hazardous materials by name and the anticipated quantity brought aboard, MSDS and appropriate neutralizing agents, buffers, and/or absorbents in amounts adequate to address spills of a size equal to the amount of chemicals brought aboard, and a chemical hygiene plan. The amount of hazardous material arriving and leaving the vessel shall be accounted for by the Chief Scientist, and the Chief Scientist will provide the Commanding Officer with a copy of all MSDS prior to the cruise.

6.5 Scientific Computing System (SCS) - If the SCS goes down for any reason, the ship must manually restart the WINDACS\_DSJ event in addition to the other events.

## 7.0 DATA RESPONSIBILITIES

7.1 Collection of Data - The Chief Scientist will receive all original data related to the project. The Chief Scientist will in turn furnish the Commanding Officer with a complete inventory listing of all data gathered by the scientific party, detailing types of operations and quantities of data prior to departing the ship. All data gathered by the vessel's personnel that are desired by the Chief Scientist will be released to her, including supplementary data specimens and photos gathered by the scientific crew.

7.2 Dissemination of Data - The Chief Scientist is responsible for the quality assurance, disposition, and archiving of data and specimens collected aboard the ship. The Chief Scientist is also responsible for the dissemination of copies of these data to cruise participants and to any other requesters. The SWFSC cruise report will be submitted according to SWFSC procedures to appropriate persons and groups.

7.3 Request for time server - We request use of the network time server on board, the Datum Tymserver 2000. The time stamps associated with each data set we collect are used to connect it to all other data sets. Consequently, it is critical that all computers collecting scientific data (e.g., the cetacean and seabird computers, SCS computer, and all oceanographic computers) have their times synchronized. Software with written instructions should be supplied.

7.4 Foreign Research Clearance Reports - A request for research clearance in foreign waters has been submitted by SWFSC. The Chief Scientist is responsible for satisfying the post cruise obligations associated with diplomatic clearances to conduct research operations in foreign waters.

7.5 Evaluation Form - The Chief Scientist will complete the Ship Operations Evaluation Form and forward it to the Office of Marine and Aviation Operations. The Commanding Officer will provide this form.

## 8.0 ADDITIONAL INVESTIGATIONS AND PROJECTS

Ancillary projects are secondary to the objectives of the cruise, should be treated as additional investigations, do not have representation aboard, and are accomplished by the ship's force. Ancillary tasks will be accomplished in accordance with the NOAA Fleet Standing Ancillary Instructions. Any additional work will be conducted so as not to interfere with operations as outlined in these instructions. The Chief Scientist will be responsible for determining the priority of additional work relative to the primary project with approval from the Commanding Officer.

## 9.0 COMMUNICATIONS

9.1 Radios - The Cruise Leader or designee may request, from the Commanding Officer, the use of radio transceivers aboard the ship to communicate with other vessels and aircraft, if necessary.

SWFSC will supply their own handheld radios for intra-ship communication and communication

with the small boats. However, the Cruise Leader may request the use of the ship's handheld radios if the supplied scientific radios should fail.

9.2 Telephone - The Cruise Leader or designee may require access to the ship's INMARSAT or cellular telephone systems with permission from the Commanding Officer. The Commanding Officer will provide the Cruise Leader with a log of all INMARSAT calls made from the ship for SWFSC business at the end of each leg. In accordance with the Communications Reimbursement Policy, SWFSC will pay these charges via a transfer of funds from SWFSC to the ship.

9.3 Electronic Mail - All members of the scientific party will have access to e-mail for communications with persons not aboard the ship. The amount of such communication traffic will be determined by the Chief Scientist. Regular (at least monthly) updates on communication charges will be provided by the ship to the Cruise Leader and Chief Scientist so that they can determine if additional restrictions are needed.

E-mail communication between NOAA Ship *David Starr Jordan* and *McArthur II* is essential and will be assumed to be in working order. Voice communications between scientific personnel on the two ships may be required at the discretion of the Cruise Leader. A regular communication between the vessels may be requested.

9.4 Facsimile - A working fax machine must be provided by the ship. Permits may not be secured prior to departure and a working fax is necessary to transmit permits and other documents.

9.5 Routine Reports - The Cruise Leader will submit a weekly cruise report, along with time and attendance for the scientific party, to the Survey Coordinator each Thursday during the cruise via e-mail or, if e-mail is not functioning properly, via fax. The Survey Coordinator at SWFSC will be on the distribution list for the ship's noon position reports.

## 10.0 MISCELLANEOUS

10.1 Pre-cruise Meeting - A pre-cruise meeting between the Chief Scientist (and her staff) and the Commanding Officer (and her staff) was held on July 17<sup>th</sup> at 1300 to identify operational requirements (*i.e.* overtime, modifications, repairs, or procurements).

10.2 Underway Meetings - Meetings between the Commanding Officer (and other officers) and the Cruise Leader should occur at the beginning and end of each leg to discuss and solve any problems or changes that may arise. Additional meetings should occur as needed.

10.3 Debrief - A post-cruise debriefing will be held between the Chief Scientist and the Commanding Officer. If serious problems are identified, the Commanding Officer shall notify the Marine Operations Center, Pacific, in the most direct means available. The Chief Scientist shall document identified problems in the Ship Operations Evaluation Form. The time and date of the debrief will be determined toward the end of the cruise.

10.4 Time and Attendance - Time and attendance will be filled out by the Survey Coordinator while the ship is at sea, based on information transmitted by the Cruise Leader to the Survey Coordinator. Scheduled overtime is authorized for Saturdays, Sundays and holidays. Irregular overtime will be authorized by the Cruise Leader as required. SWFSC personnel are authorized per diem at the rate of

\$3.50 per day to be paid via a travel voucher at the termination of the cruise. Task Number 2006 30-51-0002-00-00-00-00 D8LAM06-P20 will pay for per diem and overtime for any SWFSC permanent, term, or temporary employees: Cruise Leaders, Marine Mammal and Seabird Observers, and Oceanographers. Regular salary for these personnel will be paid by the CYOP task from which they are normally paid.

Time and attendance for contracted employees will be based upon a pre-determined schedule. If events of the cruise alter the planned schedule, the Cruise Leader will notify the Survey Coordinator, and appropriate changes will be made.

10.5 Navigation - Primary control will be GPS, also dead reckoning based on visual bearings and radar ranges when possible.

10.6 Scientific Spaces - The Cruise Leader shall be responsible for the proper upkeep and cleaning of all spaces assigned to the scientific party, both laboratory and living spaces, throughout the cruise. The Cruise Leader or Chief Scientist will make berthing assignments for scientific personnel on a per-leg basis, with approval of the Commanding Officer.

10.7 United States Fish and Wildlife Service Inspection and Documentation - Upon arrival into San Diego, the ship must declare all samples of biological origin to the USFWS authorities who board the ship. The Cruise Leader on Leg 6 will be responsible for compiling a clean and complete list using the declaration forms in the Cruise Leader Manual. A sample declaration form is provided. The USFWS will conduct an inspection of the ship when docked. No one (officers, crew, or scientists) is allowed to leave the ship until this inspection is completed.

Specimens that must be declared include protected species (cetacean biopsy samples, turtle blood samples, turtle biopsy samples, and salvaged protected species or parts thereof), aquarium specimens, flyingfish, other dipnet specimens, manta samples, bongo tow samples, shells and corals, home packed fish, squids, invertebrates, salvaged birds (including feathers and other avian parts), and other life or parts of life. All specimens must be declared by country of collection.

11.0 STAR 2006 CRUISE EXCLUDING THE WATERS OF THE MEXICAN EEZ - If Mexican research clearance is not obtained, or if it contains conditions that are impossible to meet, no data will be collected in the waters of the Mexican EEZ (see Appendices 1 and 2 for tracklines and waypoints). The port dates and locations will be altered as listed below. Other alterations are detailed in section 11.1..

Itinerary:

28 JUL- EK 500 Calibration: Off 10<sup>th</sup> Avenue Terminal

LEG 1: 29 JUL - Depart San Diego, CA	17 AUG- Arrive Manzanillo, Mexico
LEG 2: 20 AUG - Depart Manzanillo	04 SEP - Arrive Puntarenas, Costa Rica
LEG 3: 07 SEP - Depart Puntarenas	27 SEP - Arrive Puerto Quetzal, Guatemala
LEG 4: 03 OCT - Depart Puerto Quetzal	23 OCT - Arrive Acapulco, Mexico
LEG 5: 26 OCT - Depart Acapulco	15 NOV - Arrive Manzanillo, Mexico
LEG 6: 18 NOV - Depart Manzanillo	07 DEC- Arrive San Diego, CA/EK 500 Calibration

11.1 Aerial Calibration – There will be no aerial calibration conducted if Mexican research clearance is not obtained.

For further information contact Annette Henry, Survey Coordinator, Southwest Fisheries Science Center, National Marine Fisheries Service, NOAA, 8604 La Jolla Shores Drive, La Jolla, CA 92037; Phone (858) 546-5672. More information about the cruise and project can also be found at the STAR website: <http://swfsc.nmfs.noaa.gov/prd/star/default.htm>

Prepared by: Sarah E. Jackson <sup>LTJG</sup> NOAA  
LTJG Sarah E. Jackson, NOAA  
Assistant Survey Coordinator, SWFSC

Dated: 24 July 2006

J. T. Ballance  
Dr. Lisa T. Ballance  
Chief Scientist, SWFSC

Dated: 24 July 2006

Approved by: W. Fox, Jr.  
Dr. William W. Fox, Jr.  
Science Director, F/SWR

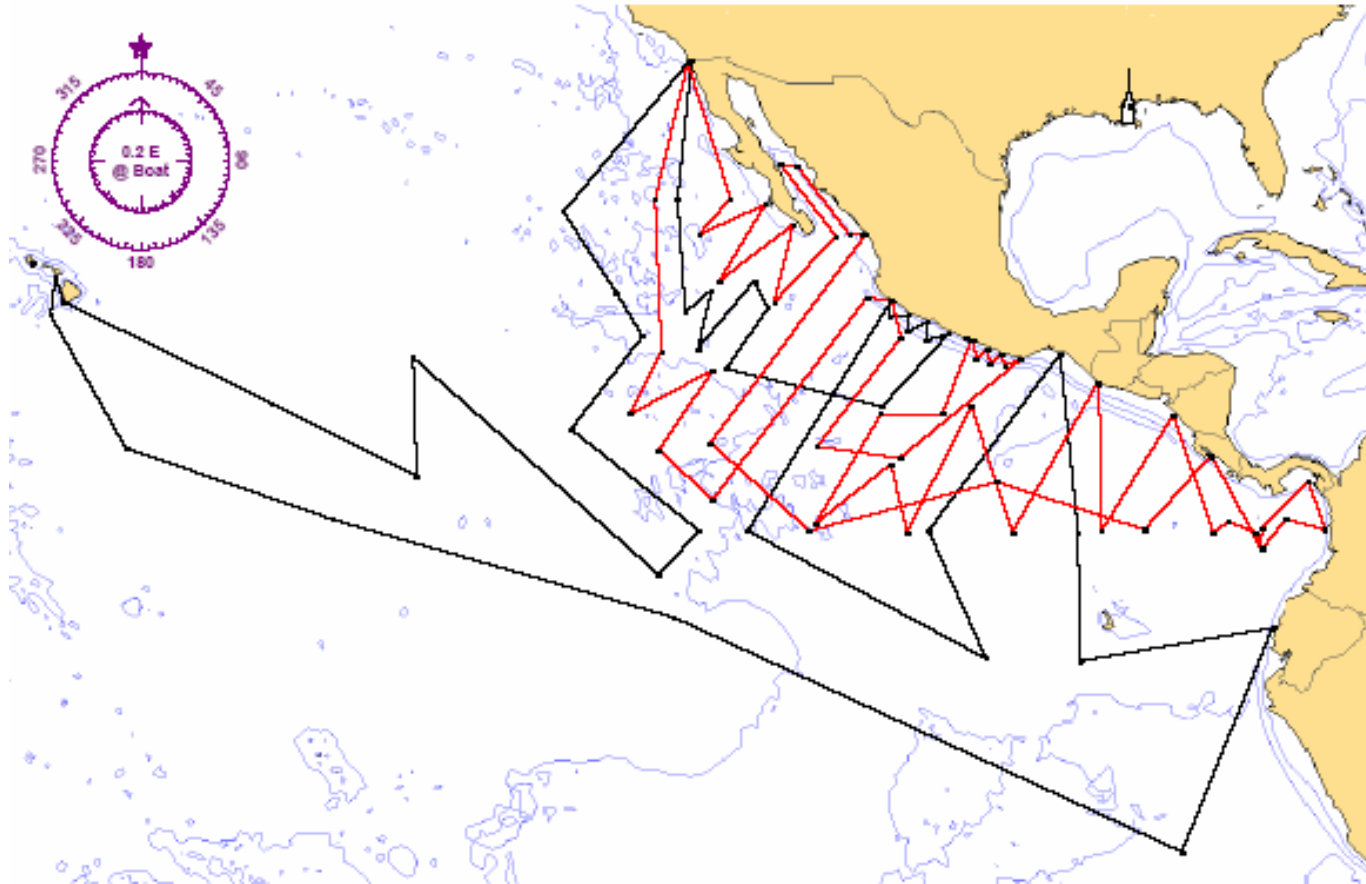
Dated: 7/25/06

Approved by: Mark P. Ablondi  
for Captain Mark P. Ablondi, NOAA  
Director Marine Operations Center - Pacific

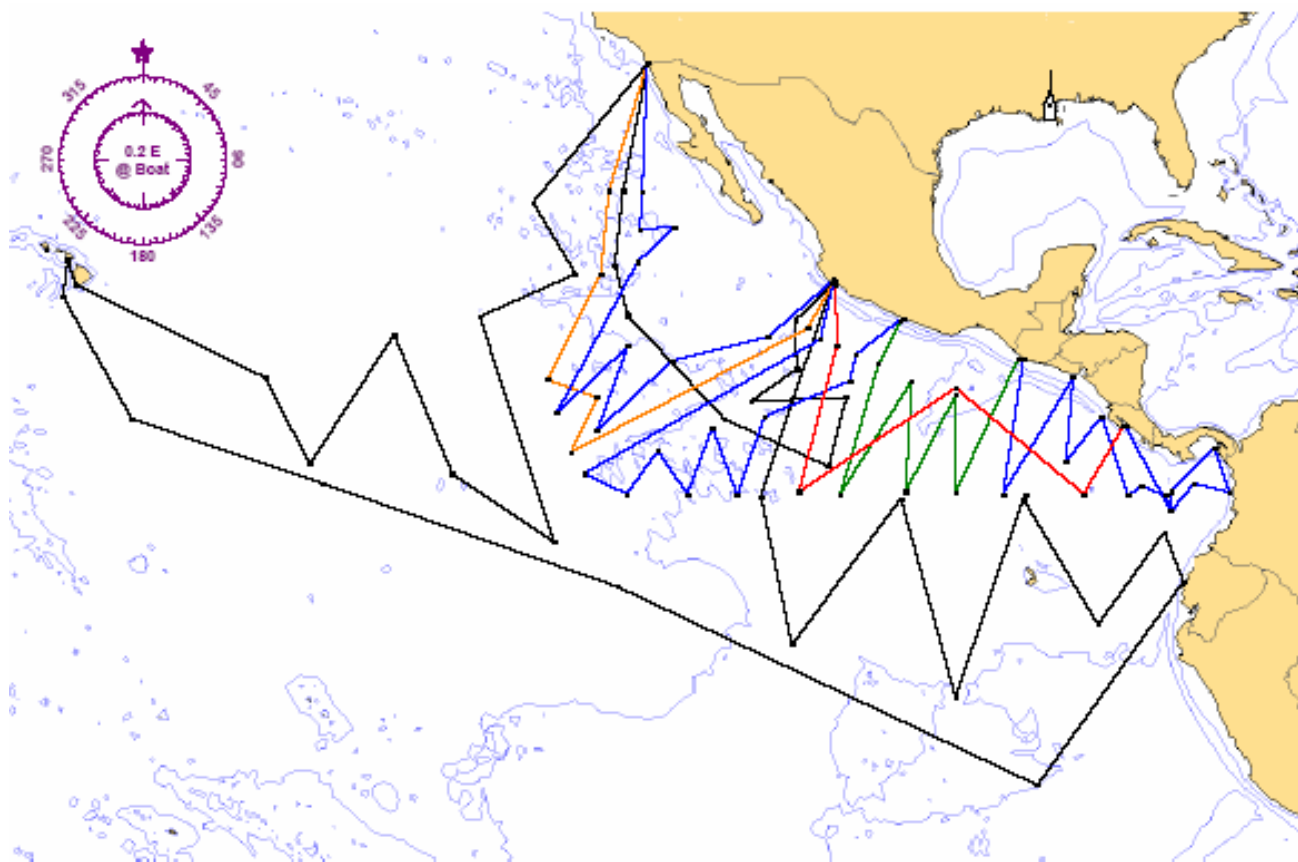
Dated: 7/25/06



**Appendix 1:** Tracklines for NOAA ships *David Starr Jordan* and *McArthur II* for a) STAR 2006 and b) STAR 2006 excluding the waters of the Mexican EEZ.



**a:** Tracklines for NOAA Ships *David Starr Jordan* (red) and *McArthur II* (black).



**b:** Tracklines for NOAA Ships *David Starr Jordan* (colored) and *McArthur II* (black) excluding the waters of the Mexican EEZ.

**Appendix 2:** STAR 2006 waypoints for NOAA Ship *David Starr Jordan*. Waypoints are included for the STAR 2006 Cruise (Table 1) and the STAR 2006 Cruise excluding the waters of the Mexican EEZ (Table 2).

**Table 1:** STAR 2006 waypoints for NOAA Ship *David Starr Jordan*.

Description	Latitude	Longitude
<b>Leg 1: San Diego to Mazatlán, Mexico</b>		
	32 26.289 N	117 14.469 W
	25 02.826 N	114 37.274 W
	22 54.815 N	116 33.384 W
	24 38.377 N	112 25.087 W
	20 16.123 N	115 18.359 W
	23 29.490 N	110 39.696 W
	18 58.263 N	111 52.934 W
	22 51.505 N	108 04.287 W
	26 55.828 N	111 27.926 W
	26 52.625 N	110 27.191 W
	22 54.815 N	107 10.698 W
	23 01.432 N	106 20.681 W
Leg 1 Total Distance		2,811 nautical miles
<b>Leg 2: Mazatlán, Mexico to Puntarenas, Costa Rica</b>		
	22 54.815 N	106 11.750 W
	10 32.959 N	115 52.299 W
	05 05.311 N	109 40.748 W
	08 06.703 N	098 04.136 W
	05 10.102 N	088 51.944 W
	09 43.176 N	084 48.590 W
Leg 2 Total Distance		3,076 nautical miles
<b>Leg 3: Puntarenas, Costa Rica to Puerto Quetzal, Guatemala</b>		
	09 40.769 N	084 43.739 W
	03 57.273 N	081 40.617 W
	05 13.330 N	081 36.979 W
	08 08.516 N	078 41.741 W
	05 09.683 N	077 39.285 W
	05 48.570 N	080 07.844 W
	03 57.882 N	081 36.979 W
	05 01.170 N	082 00.021 W
	05 36.118 N	083 40.374 W
	05 01.000 N	084 34.892 W
	12 11.660 N	087 06.728 W
	05 04.819 N	091 31.214 W
	13 54.822 N	090 46.708 W
Leg 3 Total Distance		2,922 nautical miles
<b>Leg 4: Puerto Quetzal, Guatemala to Acapulco, Mexico</b>		
	13 55.000 N	090 47.000 W
	05 01.728 N	097 03.354 W
	12 43.258 N	099 36.976 W
	05 01.728 N	103 36.341 W

Description	Latitude	Longitude
	09 11.478 N	104 37.076 W
	05 33.958 N	109 19.312 W
	12 15.174 N	105 12.802 W
	12 15.174 N	101 24.155 W
	16 43.474 N	099 36.303 W
Leg 4 Total Distance		3,246 nautical miles
<b>Leg 5: Acapulco, Mexico to Manzanillo, Mexico</b>		
	16 41.137 N	099 31.453 W
	15 39.258 N	099 19.113 W
	16 12.098 N	098 38.028 W
	15 21.937 N	098 29.097 W
	15 53.096 N	097 48.012 W
	15 16.736 N	097 31.935 W
	15 34.064 N	096 38.346 W
	09 36.312 N	104 04.922 W
	10 17.928 N	109 11.050 W
	16 56.711 N	104 01.640 W
	19 05.108 N	104 32.208 W
Leg 5 Total Distance		1,809 nautical miles
<b>Leg 6: Manzanillo, Mexico to San Diego, CA</b>		
	19 05.108 N	104 32.208 W
	19 16.631 N	106 06.801 W
	07 03.321 N	115 39.795 W
	10 01.116 N	118 59.861 W
	14 58.018 N	115 40.884 W
	12 16.752 N	120 49.701 W
	16 04.876 N	118 52.770 W
	24 56.315 N	119 15.938 W
	32 26.289 N	117 14.469 W
Leg 6 Total Distance		3,222 nautical miles

**Table 2:** STAR 2006 waypoints for NOAA Ship *David Starr Jordan* for the STAR Cruise excluding the waters of the Mexican EEZ.

Description	Latitude	Longitude
<b>Leg 1: San Diego to Manzanillo, Mexico</b>		
	32 26.289 N	117 14.469 W
	24 53.229 N	117 30.576 W
	22 34.809 N	117 40.278 W
	22 37.061 N	115 19.606 W
	20 27.730 N	117 52.405 W
	10 31.224 N	123 17.405 W
	15 00.158 N	118 28.785 W
	09 21.492 N	120 34.905 W
	14 03.456 N	115 31.733 W
	15 37.821 N	109 01.247 W
	19 08.535 N	104 42.944 W

Description	Latitude	Longitude
<b>Leg 2: Manzanillo, Mexico to Puntarenas, Costa Rica</b>		
	18 59.887 N	104 24.754 W
	14 57.801 N	104 19.903 W
	05 15.753 N	106 52.702 W
	12 11.738 N	096 14.827 W
	05 04.810 N	087 34.583 W
	09 43.176 N	084 48.590 W
<b>Leg 3: Puntarenas, Costa Rica to Puerto Quetzal, Guatemala</b>		
	09 40.769 N	084 43.739 W
	03 57.273 N	081 40.617 W
	05 13.330 N	081 36.979 W
	08 08.516 N	078 41.741 W
	05 09.683 N	077 39.285 W
	05 48.570 N	080 07.844 W
	03 57.882 N	081 36.979 W
	05 01.170 N	082 00.021 W
	05 36.118 N	083 40.374 W
	05 01.000 N	084 34.892 W
	10 19.219 N	086 20.609 W
	07 15.880 N	088 48.557 W
	12 57.003 N	088 17.027 W
	05 07.242 N	093 03.222 W
	14 05.823 N	091 40.759 W
<b>Leg 4: Puerto Quetzal, Guatemala to Acapulco, Mexico</b>		
	16 41.693 N	100 02.813 W
	14 23.566 N	102 59.865 W
	12 41.533 N	103 27.757 W
	10 18.318 N	109 12.464 W
	05 02.378 N	111 06.154 W
	09 37.143 N	112 48.020 W
	05 07.242 N	114 28.673 W
	08 00.646 N	116 28.729 W
	05 07.242 N	118 33.636 W
	06 29.827 N	121 25.838 W
	15 28.416 N	105 27.813 W
	19 05.108 N	104 32.208 W
<b>Leg 5: Acapulco, Mexico to Manzanillo, Mexico</b>		
	16 41.693 N	100 02.813 W
	14 23.566 N	102 59.865 W
	12 41.533 N	103 27.757 W
	10 18.318 N	109 12.464 W
	05 02.378 N	111 06.154 W
	09 37.143 N	112 48.020 W
	05 07.242 N	114 28.673 W
	08 00.646 N	116 28.729 W
	05 07.242 N	118 33.636 W
	06 29.827 N	121 25.838 W
	15 28.416 N	105 27.813 W

<b>Description</b>	<b>Latitude</b>	<b>Longitude</b>
	19 05.108 N	104 32.208 W
<b>Leg 6: Manzanillo, Mexico to San Diego, CA</b>		
	19 05.108 N	104 32.208 W
	16 07.163 N	106 18.746 W
	07 57.019 N	122 19.196 W
	11 33.517 N	120 37.330 W
	12 45.104 N	123 56.211 W
	19 41.900 N	120 22.778 W
	24 55.441 N	119 46.397 W
	32 26.289 N	117 14.469 W

**Appendix 3:** Personnel aboard NOAA Ship *David Starr Jordan* for the *Stenella* Abundance Research Project 2006

<i>David Starr Jordan</i> Leg 1: San Diego, CA - Mazatlán, Mexico		
Position	Name	Affiliation
Cruise Leader	Robert Pitman	SWFSC
Senior Mammal Observer	Juan Carlos Salinas	AFL
Senior Mammal Observer	Cornelia Oedekoven	AFL
Marine Mammal ID Specialist	Gary Friedrichsen	SWFSC
Mammal Observer	Ernesto Vasquez	AFL
Mammal Observer	Adam Ü	SWFSC
Mammal Observer	Laura Morse	SWFSC
Senior Bird Observer	Richard Pagen	SWFSC
Bird Observer	Chris Cutler	SWFSC
Oceanographer	Candice Hall	AFL
Turtle Handler	Lindsey Peavey	SWFSC Volunteer
Foreign Observer	Manuel Inclan	Mexico
Visiting Scientist	Iliana Ruiz-Cooley	New Mexico State University
Visiting Scientist	TBD	TBD
Teacher-at-sea	Mark Harris	ARMADA

<i>David Starr Jordan</i> Leg 2: Mazatlán, Mexico – Puntarenas, Costa Rica		
Position	Name	Affiliation
Cruise Leader	Robert Pitman	SWFSC
Senior Mammal Observer	Juan Carlos Salinas	AFL
Senior Mammal Observer	Cornelia Oedekoven	AFL
Marine Mammal ID Specialist	Gary Friedrichsen	SWFSC
Mammal Observer	Ernesto Vasquez	AFL
Mammal Observer	Adam Ü	SWFSC
Mammal Observer	Laura Morse	SWFSC
Senior Bird Observer	Richard Pagen	SWFSC
Bird Observer	Chris Cutler	SWFSC
Oceanographer	Candice Hall	AFL
Turtle Handler	Lindsey Peavey	SWFSC Volunteer
Foreign Observer	JF Cordova Soriano	El Salvador
Foreign Observer	Christian Naranjo	Ecuador
Visiting Scientist	Brad Wiley	NMFS/Headquarters
Visiting Scientist	Iliana Ruiz-Cooley	New Mexico State University

<i>David Starr Jordan Leg 3: Puntarenas Costa Rica - Quetzal, Guatemala</i>		
<b>Position</b>	<b>Name</b>	<b>Affiliation</b>
Cruise Leader	Robert Pitman	SWFSC
Senior Mammal Observer	Juan Carlos Salinas	AFL
Senior Mammal Observer	Cornelia Oedekoven	AFL
Marine Mammal ID Specialist	Gary Friedrichsen	SWFSC
Mammal Observer	Ernesto Vasquez	AFL
Mammal Observer	Adam Ü	SWFSC
Mammal Observer	Laura Morse	SWFSC
Senior Bird Observer	Richard Pagen	SWFSC
Bird Observer	Chris Cutler	SWFSC
Oceanographer	Candice Hall	AFL
Turtle Handler	Lindsey Peavey	SWFSC Volunteer
Foreign Observer	Anna Nunez P.	Panama
Visiting Scientist	Mateo Lopez-Victoria	TBD
Visiting Scientist	Tim Gerrodette	SWFSC
Visiting Scientist	Ignacio Vilchis	AFL

<i>David Starr Jordan Leg 4: Puerto Quetzal - Acapulco, Mexico</i>		
<b>Position</b>	<b>Name</b>	<b>Affiliation</b>
Cruise Leader	Lisa Ballance	SWFSC
Senior Mammal Observer	Juan Carlos Salinas	AFL
Senior Mammal Observer	Cornelia Oedekoven	AFL
Marine Mammal ID Specialist	Gary Friedrichsen	SWFSC
Mammal Observer	Ernesto Vasquez	AFL
Mammal Observer	Adam Ü	SWFSC
Mammal Observer	Laura Morse	SWFSC
Senior Bird Observer	Richard Pagen	SWFSC
Bird Observer	Chris Cutler	SWFSC
Oceanographer	Candice Hall	AFL
Turtle Handler	Lindsey Peavey	SWFSC Volunteer
Foreign Observer	LA Salaverria Reyes	Guatemala
Visiting Scientist	Ignacio Vilchis	AFL
Visiting Scientist	Carl Safina	Blue Ocean Institute
Visiting Scientist	Robert Pitman	SWFSC



<i>David Starr Jordan Leg 5: Acapulco, Mexico - Manzanillo, Mexico</i>		
<b>Position</b>	<b>Name</b>	<b>Affiliation</b>
Cruise Leader	Lisa Balance	SWFSC
Senior Mammal Observer	Juan Carlos Salinas	AFL
Senior Mammal Observer	Cornelia Oedekoven	AFL
Mammal Observer	Gary Friedrichsen	SWFSC
Mammal Observer	Ernesto Vasquez	AFL
Mammal Observer	Adam Ü	SWFSC
Mammal Observer	Laura Morse	SWFSC
Senior Bird Observer	Richard Pagen	SWFSC
Bird Observer	Chris Cutler	SWFSC
Oceanographer	Candice Hall	AFL
Turtle Handler	Lindsey Peavey	SWFSC Volunteer
Foreign Observer	TBD	TBD
Visiting Scientist	Annette Henry	SWFSC
Visiting Scientist	Tony Gaston	Canadian Wildlife Institute
Visiting Scientist	Gabriel Aldana	Mexico

<i>David Starr Jordan Leg 6: Manzanillo, Mexico - San Diego, CA</i>		
<b>Position</b>	<b>Name</b>	<b>Affiliation</b>
Cruise Leader	Sarah Mesnick	SWFSC
Senior Mammal Observer	Juan Carlos Salinas	AFL
Senior Mammal Observer	Cornelia Oedekoven	AFL
Mammal Observer	Gary Friedrichsen	SWFSC
Mammal Observer	Ernesto Vasquez	AFL
Mammal Observer	Adam Ü	SWFSC
Mammal Observer	Laura Morse	SWFSC
Senior Bird Observer	Richard Pagen	SWFSC
Bird Observer	Chris Cutler	SWFSC
Oceanographer	Candice Hall	AFL
Turtle Handler	Lindsey Peavey	SWFSC Volunteer
Foreign Observer	TBD	TBD
Visiting Scientist	Caroline Weir	Ketos Ecology - UK
Visiting Scientist	Jessica Kondel	NMFS-Long Beach
Visiting Scientist	Gabriel Aldana	Mexico



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
Southwest Fisheries Center  
8604 La Jolla Shores Drive  
La Jolla, California 92037

MEMORANDUM FOR: Commanding Officer, NOAA Ship *David Starr Jordan*

FROM: Sarah E. Jackson, LT JG/NOAA  
Assistant Survey Coordinator, SWFSC

THROUGH: Lisa T. Ballance, PhD  
Chief Scientist, STAR Cruise 2006

SUBJECT: Statement of intent to use small boats, and assessment of risk for small boat missions during the 2006 *Stenella* Abundance Research Project (STAR) cruise aboard NOAA Ship *David Starr Jordan*.

#### **Assessment of Risk**

In addition to the general risks inherent in all small boat operations at sea, operations for the purposes defined here carry the following specific risks due to the nature of the mission:

- 1) Launch and retrieval  
The greatest risks are likely to be during launching and retrieval. To mitigate this risk we are taking extensive time prior to the cruise to drill crew and scientists on safe launching and retrieval techniques.
- 2) Cross-bow/firearm use  
Biopsy sampling is done with crossbows and rifle-powered dart guns. Although SWFSC biopsy team personnel are extensively trained in the proper use of this equipment prior to the cruise, the fact that crossbows are in use aboard the boat should be kept in mind by the boat crews at all times, and should be discussed as a special circumstance during mission briefing.
- 3) Falls within the small boat  
Falls are generally caused by an unexpected movement of the boat caused by wave action or by a sudden acceleration or deceleration by the cox'n. To mitigate this risk, we will require the cox'n to notify all occupants prior to a rapid change in course or speed. Prior to accelerating from a stop, the cox'n will ask all occupants if they are ready and will wait for a reply before proceeding. The cox'n will also be responsible for watching for rouge waves and for notifying occupants if the vessel is expected to take a sudden lurch.
- 4) Capture of live animals  
Although turtles do not move fast, they are very large and powerful animals. Risk to personnel in the water exists when bringing turtles aboard, both from the turtle and from the small boat. Attention to boat handling is extremely important when working in the proximity of a swimmer. Therefore, competence and experience are essential attributes of the coxswains for these missions. The Chief Boatswain aboard NOAA Ship *David Starr Jordan* is proficient in this type of boat handling and should personally train all coxswains to be assigned to this duty.



5) Island landings

Potential island landings and departures are required on this expedition for seabird colony censuses. Potential islands include: Clipperton, France; Alijos Rocks, Mexico; San Benedicto, Mexico; Guadalupe, Mexico; Malpelo, Colombia; and Cocos, Costa Rica. Landings and departures are not expected to be problematic but the cox'n should exercise due caution in choosing a landing location, timing the waves, and potentially deciding not to land at a requested time.

6) Clipperton Island landing

Landing and departing Clipperton Island can be problematic due to heavy surf conditions. Upon arrival at the island, the Commanding Officer, the Cruise Leader, and the Chief Boatswain should jointly evaluate the conditions near Clipperton Island from the *David Starr Jordan*. The Chief Boatswain has extensive experience with Clipperton Island landings and is familiar with the safest locations and protocols. If conditions appear acceptable for landing at the island, the small boat should be deployed for the Chief Boatswain and the Cruise Leader to examine conditions in close proximity to the island. If conditions appear that a landing is safe and feasible, then the scientific survey party (observers) should board the small boat for Clipperton Island. Only observers who swim well should participate in the bird survey.

**Appendix 5: Possession or Use of Alcohol or Illegal Drugs**

Possession or use of alcohol, illegal drugs, or prescription medications without a prescription, on board any NOAA vessel, by any member of the embarked complement is strictly forbidden and will not be tolerated. When violations of this policy are discovered, the following procedures will be adhered to:

- The alcohol will be confiscated and immediately disposed of in the presence of a witness.
- Drugs will be confiscated and placed in a secured location until the vessel reaches home port or another port of call, at which time the offense will be reported, and the drugs turned over to the appropriate authorities for action.
- Disciplinary or corrective action will be taken in accordance with the applicable Table of Offenses and Penalties.
- Department of Commerce employees will be given information regarding the availability of the Department of Commerce Employees Assistance Program.

## **Appendix 6: Sexual Harassment**

Sexual harassment will not be tolerated aboard NOAA vessels. This applies to all persons, male and female, including members of the operating crew and any embarked scientific personnel or other personnel. Sexual harassment is sex (gender) discrimination that involves unwelcome sexual conduct, which can include both verbal and physical behavior. Some examples of such behavior are: pressure for dates or sex; sexually suggestive looks, comments or gestures; sexual jokes; displaying material of a sexual nature; and deliberate touching. Conduct is unwelcome if it is unsolicited and an individual finds it undesirable and/or offensive. All instances of sexual harassment should be immediately reported to your supervisor, the XO, or the CO.

**Appendix 7: Argo Float Deployment**

No.	Longitude	Latitude	Approx. Date	S/N	Notes: Deploy at convenience near...
<b>Mazatlan (Aug 17<sup>th</sup>) to Puntarenas (Sep 4<sup>th</sup>)</b>					
1	114° 00' W	14° 00' N	Aug. 19, 2006		First station exiting eez
2	116° 00' W	11° 30' N	Aug. 21 2006		Waypoint
3	97° 00' W	8° 00' N	Aug. 29, 2006		Waypoint
4	92° 00' W	6° 48' N	Aug. 31, 2006		Last station before eez
<b>Manzanillo (November 18<sup>th</sup>) to San Diego (December 7<sup>th</sup>)</b>					
5	109° 00' W	15° 00' N	Nov. 20, 2006		First station exiting eez
6	114° 00' W	8° 30' N	Nov. 22, 2006		Middle of section
7	119° 00' W	10° 30' N	Nov. 24, 2006		Waypoint